ORDERING BASEBALL SALARIES: A STATISTICS EXPERIENCE

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Teachers are always looking for real world situations that can be used to motivate and explain statistical ideas. One such situation concerns baseball salaries. We obtained the information from the March 30, 1990, *USA TODAY.*

There were 974 players on the major league teams' rosters before the opening day of 1990, these players having annual salaries ranging from $3,200,000 to $100,000. The sum of all 974 annual salaries is an amazing $452,584,249, close to a half billion dollars, while the mean salary is $464,666 and the median is $190,000. The fact that the median is so much lower than the mean indicates a very skewed distribution.

How can these data be further displayed and dramatized? We shall present several ways. None requires any sophisticated statistics; all are achieved by computing with ranked raw data.

1. The top 21 players (2.2% of the total number) earn more than 10% of the total salaries.

   The top 44 players (4.5% of the total number) earn more than 20% of the total salaries.

   The top 73 players (7.5% of the total number) earn more than 30% of the total salaries.

   The top 108 players (11.1% of the total number) earn more than 40% of the total salaries.

   The top 149 players (15.3% of the total number) earn more than 50% of the total salaries.

   It is interesting to note that these 149 players who earned 50% of the total salaries each earned more than $1,000,000. In fact there were 150 "millionaires" on the rosters.

2. Suppose that the 974 salaries are listed in decreasing order and are divided into 10 subsets of approximately the same number of players

per subset. Then:

The top 10% of the players earn 37.5% of the money.
The top 20% of the players earn 59.2% of the money.
The top 30% of the players earn 73.6% of the money.
The top 40% of the players earn 82.7% of the money.
The top 50% of the players earn 88.8% of the money.
The top 60% of the players earn 91.3% of the money.
The top 70% of the players earn 93.6% of the money.
The top 80% of the players earn 95.8% of the money.
The top 90% of the players earn 97.9% of the money.

3. To restate the data of (2) in another way:

Grouping of Players		Percent of Total Salaries Earned
Top	10%	37.5%
Second	10%	21.7%
Third	10%	14.4%
Fourth	10%	9.1%
Fifth	10%	5.3%
Sixth	10%	3.3%
Seventh	10%	2.3%
Eighth	10%	2.2%
Ninth	10%	2.1%
Bottom	10%	2.1%

4. The top salary is equal to the sum of the bottom 39 salaries. The sum of the top two salaries is more than the sum of the bottom 61 salaries.

   The sum of the top three salaries is more than the sum of the bottom 86 salaries.

   The sum of the top four salaries is more than the sum of the bottom 111 salaries.

   The sum of the top five salaries is more than the sum of the bottom 136 salaries.

   The sum of the top six salaries is more than the sum of the bottom 158 salaries.

The sum of the top seven salaries is more than the sum of the bottom 181 salaries.

The sum of the top eight salaries is more than the sum of the bottom 202 salaries.

The sum of the top nine salaries is more than the sum of the bottom 223 salaries.

The sum of the top ten salaries is more than the sum of the bottom 245 salaries.

5. We calculated the mean salary for each team (to the nearest $1000.)

Team	Mean Salary	Team	Mean Salary
1. New York Yankees	$617,000	14. Detroit Tigers	$476,000
2. Kansas City Royals	$597,000	15. Toronto Blue Jays	$474,000
3. California Angels	$591,000	16. Pittsburgh Pirates	$447,000
4. Los Angeles Dodgers	$569,000	17. Chicago Cubs	$426,000
5. New York Mets	$563,000	18. Cincinnati Reds	$399,000
6. Oakland Athletics	$555,000	19. Cleveland Indians	$389,000
7. St. Louis Cardinals	$536,000	20. Texas Rangers	$387,000
8. San Francisco Giants	$524,000	21. Philadelphia Phillies	$377,000
9. Houston Astros	$523,000	22. Atlanta Braves	$370,000
10. Boston Red Sox	$518,000	23. Minnesota Twins	$368,000
11. San Diego Padres	$502,000	24. Seattle Mariners	$341,000
12. Milwaukee Brewers	$500,000	25. Chicago White Sox	$288,000
13. Montreal Expos	$490,000	26. Baltimore Orioles	$257,000

6. We also calculated the mean salary for each position.

Position	Mean Salary
Pitcher	$414,000
Catcher	$360,000
Infield	$516,000
Outfield	$570,000

7. The following are the players who earn at least $2,000,000 for 1990.

Player	Team	Position	Salary
1. Robin Yount	Milwaukee Brewers	Outfield	$3,200,000
2. Kirby Puckett	Minnesota Twins	Outfield	$2,816,667
3. Paul Molitor	Milwaukee Brewers	Infield	$2,600,000
4. Eddie Murray	Los Angeles Dodgers	Infield	$2,513,703
5. Don Mattingly	New York Yankees	Infield	$2,500,000
6. Rickey Henderson	Oakland Athletics	Outfield	$2,250,000
7. Will Clark	San Francisco Giants	Infield	$2,250,000
8. Mark Davis	Kansas City Royals	Pitcher	$2,125,500
9. Tom Browning	Cincinnati Reds	Pitcher	$2,125,000
10. Ted Higuera	Milwaukee Brewers	Pitcher	$2,125,000
11. Andre Dawson	Chicago Cubs	Outfield	$2,100,000
12. Eric Davis	Cincinnati Reds	Outfield	$2,100,000
13. Jack Morris	Detroit Tigers	Pitcher	$2,100,000
14. Kent Hrbek	Minnesota Twins	Infield	$2,100,000
15. Pedro Guerrero	St. Louis Cardinals	Infield	$2,083,333
16. Kevin Michell	San Francisco Giants	Outfield	$2,083,000
17. Mark Gubicza	Kansas City Royals	Pitcher	$2,066,667
18. Tim Raines	Montreal Expos	Outfield	$2,055,555
19. Dale Murphy	Atlanta Braves	Outfield	$2,000,000
20. Fernando Valenzuela	Los Angeles Dodgers	Pitcher	$2,000,000
21. Jose Canseco	Oakland Athletics	Outfield	$2,000,000
22. Von Hayes	Philadelphia Phillies	Outfield	$2,000,000
23. Jack Clark	San Diego Padres	Infield	$2,000,000
24. George Bell	Toronto Blue Jays	Outfield	$2,000,000

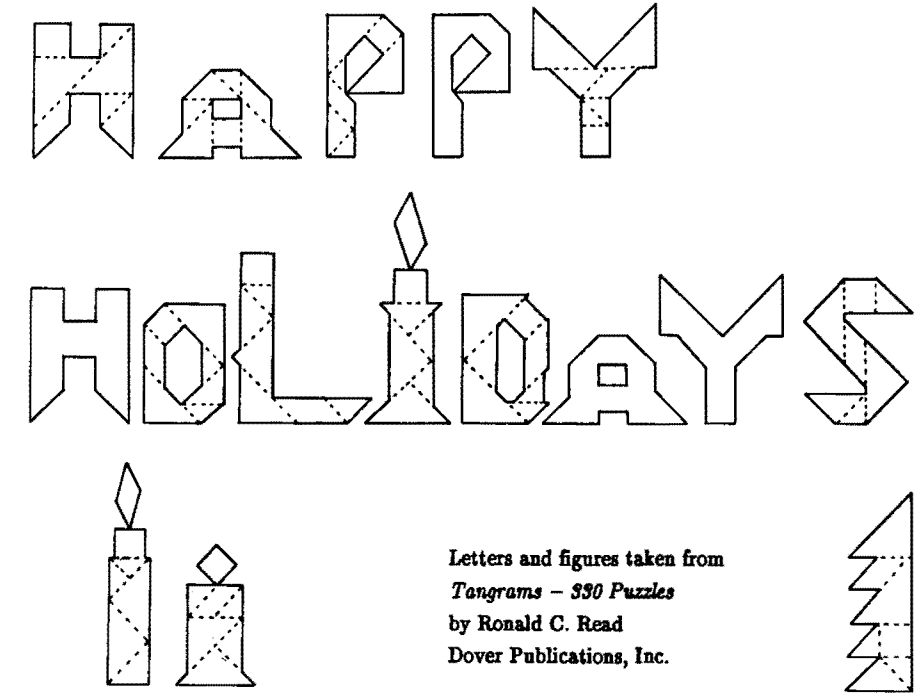
Challenges:

1) Suppose that the average salary of teachers is $30,000. What percent is this of:
   A) Robin Yount's salary?
   B) The mean salary for all players?

2) Suppose that Robin Yount is paid every two weeks during the entire year. Compare his two-week salary to the full-year salary of the Governor of your state.

3) Consult the *USA TODAY* article and perform a more detailed analysis for your favorite team.

4) Locate other examples of very skewed real world data and perform analyses similar to those in this article.



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